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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MARK BODDY and DANIEL P. JOHNSON

Appeal 2007-3133
Application 09/188,399
Technology Center 2100

Decided: January 30, 2008

Before LANCE LEONARD BARRY, HOWARD B. BLANKENSHIP, and
ST. JOHN COURTENAY III, *Administrative Patent Judges*.

COURTENAY, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134(a) from the Examiner's rejection of claims 1-11, 13-19, 27-29, and 32-34. The Examiner has indicated that claim 12 would be allowable if rewritten in independent form (Final Action 5). Claims 20-26, 30, and 31 have been cancelled. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

THE INVENTION

The disclosed invention relates generally to scheduling events. More particularly, Appellants' invention is directed to a method for automated finite capacity scheduling (Spec. 1). In accordance with one embodiment, a scheduler for a finite capacity process provides a schedule based on an integrated assessment of both discrete and continuous constraints (Spec. 3). Given a list of products to be provided, Appellants' scheduler generates a set of activities required to produce the products and identifies resources required and the discrete and continuous constraints related to such resources. Appellants' scheduler then creates a schedule based on such constraints (*id.*).

Independent claim 1 is illustrative:

1. A method of scheduling tasks comprising:
 - creating a list of activities required to accomplish the tasks;
 - modifying selected activities into sets of smaller activities; and
 - scheduling the activities and smaller activities based on discrete and continuous constraints, wherein the continuous constraints are related to other variables by linear mathematical relationships.

THE REFERENCES

The Examiner relies upon the following references as evidence in support of the rejections:

Goldman et al., “A Constraint-Based Scheduler for Batch Manufacturing”, IEEE Expert, Vol. 12, No. 1, 1997, pp. 49-56 (“Goldman”).

Tanaka	US 5,353,229	Oct. 4, 1994
Zweben	US 6,216,109 B1	Apr. 10, 2001

THE REJECTIONS

1. Claims 1-3, 5-8, 10, 11, 13-19, 27-29, and 32-34 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Goldman in view of Tanaka.
2. Claims 1-11, 14, 15, 19, 27-29, 33, and 34 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Zweben in view of Tanaka.

PRINCIPLES OF LAW

“What matters is the objective reach of the claim. If the claim extends to what is obvious, it is invalid under § 103.” *KSR Int’l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 1742 (2007). To be nonobvious, an improvement must be “more than the predictable use of prior art elements according to their established functions.” *Id.* at 1740. Appellants have the burden on appeal to the Board to demonstrate error in the Examiner’s position. *See In re Kahn*, 441 F.3d 977, 985-86 (Fed. Cir. 2006) (“On appeal to the Board, an

applicant can overcome a rejection [under § 103] by showing insufficient evidence of *prima facie* obviousness or by rebutting the *prima facie* case with evidence of secondary indicia of nonobviousness.”) (quoting *In re Rouffet*, 149 F.3d 1350, 1355 (Fed. Cir. 1998)). Therefore, we look to Appellants’ Briefs to show error in the proffered *prima facie* case.

Combinability under 35 U.S.C. § 103

With respect to each obviousness rejection before us, Appellants contend that the Examiner has provided insufficient evidence of motivation to combine the references (*see* App. Br. pp. 7, 9).

In view of the Supreme Court’s recent opinion in *KSR Int’l Co. v. Teleflex Inc.*, our analysis here does not turn upon whether the Examiner has provided an adequate teaching, suggestion, or motivation to combine the references. Instead, we view the question before us to be whether sufficient difference exists between the prior art and Appellants’ claims to render the claims nonobvious. In *KSR*, the Supreme Court reaffirmed that “[w]hen a patent ‘simply arranges old elements with each performing the same function it had been known to perform’ and yields no more than one would expect from such an arrangement, the combination is obvious.” *KSR*, 127 S. Ct. at 1740 (quoting *Sakraid v. Ag Pro, Inc.*, 425 U.S. 273, 282 (1976)).

This reasoning is applicable here. Regarding the combinability of the Goldman reference with Tanaka, we find Goldman’s constraint-based scheduler for batch manufacturing consists of familiar elements such as

activities to be scheduled (*see e.g.* p. 52, col. 2, “recipe activities”), various batches (and batch sizes), and constraints that would have been readily combinable with Tanaka’s teaching of well known linear mathematical constraints (*see* Tanaka, col. 1, ll. 46-49). We are of the view that such familiar elements would have been combinable by an artisan possessing ordinary skill, creativity, and common sense using known methods in a manner that would have yielded predictable results. Moreover, we find the Examiner has merely looked to Zweben for its teaching of constraint-based scheduling concepts (i.e., familiar elements) that are similar to those taught by Goldman (*see* Ans. 5-6). Thus, we conclude that an artisan would have found Zweben readily combinable with Tanaka according to the same rationale. Our reviewing court has reaffirmed that “[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *Leapfrog Enter., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1161 (Fed. Cir. 2007) (quoting *KSR*, 127 S. Ct. at 1739). Here, we note that Appellants have not rebutted the Examiner’s legal conclusion of obviousness by showing that the claimed combination of familiar elements produces any new function. Moreover, Appellants have not provided any factual evidence of secondary considerations, such as unexpected or unpredictable results, commercial success, or long felt but unmet need. Accordingly, we find Appellants’ arguments unpersuasive that the cited references have been improperly combined by the Examiner.

Elements under 35 U.S.C. § 103

I. First-stated rejection (Goldman in view of Tanaka)

Claims 1-3, 5-8, 10, 11, 13-19, 27-29, and 32-34

We consider the Examiner's rejection of claims 1-3, 5-8, 10, 11, 13-19, 27-29, and 32-34 as being unpatentable over Goldman in view of Tanaka.

We begin our analysis by noting at the outset the striking similarity between Fig. 1 of Goldman (p. 50) and Figure 1 of the instant invention. With respect to all claims 1-3, 5-8, 10, 11, 13-19, 27-29, and 32-34 that stand rejected as being unpatentable over Goldman in view of Tanaka, Appellants contend that Goldman does not teach resizing or modifying activities into smaller activities, and therefore further does not discuss scheduling both activities and smaller activities based on different types of constraints, as claimed (App. Br. 6). In particular, Appellants contend that there is no discussion in Goldman of modifying activities into smaller activities and scheduling them based on discrete and continuous constraints, as claimed (App. Br. 7).

We disagree for essentially the same reasons stated by the Examiner in the Answer (*see* Ans. 4-5). Moreover, we note that Goldman teaches that “a recipe tells what *activities* are needed to produce a batch of product” (p. 52, col. 1, *emphasis added*). Regarding Fig. 4 (p. 54), Goldman further teaches that “[t]he shorter bars grouped under the unit recipe activities are significant phases (sub activities) of the unit recipes.” (p. 52, col. 2). Goldman also teaches determining batch sizes according to various

constraints, where “[t]he recipes provide (possibly several alternative) mappings from production orders to sets of activities that make up a batch.” (p. 52, col. 3; *see also* p. 53, cols. 1). Therefore, we agree with the Examiner that Goldman’s teachings of “sub activities” and batch size determination reasonably suggest and render obvious the limitations of “modifying selected activities into sets of smaller activities,” as claimed (claim 1).¹

Regarding the limitations of “scheduling the activities and smaller activities based on discrete and continuous constraints” (claim 1), we note that Appellants’ Specification describes one example of a continuous constraint where “[e]ach activity is given a start and end bound defining how long it can run, and when it can start.” (Spec. 10:26-27). In particular, we note that Goldman teaches that “[t]he dashed vertical lines in Figure 4 depict constraints on the activities’ start and end times.” (p. 52, cols. 2-3). Moreover, Goldman also expressly teaches the use of “timing constraints” (p. 53, col. 1, ¶2) and “temporal constraints” (p. 49, col. 2, ¶1). Thus, we find that Goldman teaches scheduling activities (and smaller activities) based on the use of continuous constraints, as claimed.

Regarding discrete constraints, we note that Appellants’ Specification describes discrete constraints as being “fairly static in nature.” (Spec. 1:16). In particular, Appellants disclose an example of a static constraint as

¹ *See In re Hoeschele*, 406 F.2d 1403, 1406-07 (CCPA 1969) (“[I]t is proper to take into account not only specific teachings of the references but also the inferences which one skilled in the art would reasonably be expected to draw therefrom . . .”).

corresponding to a *resource constraint*, such as particular *tanks for holding various types of fluids* (Spec. 1:13-16). After reviewing the evidence before us, we find Goldman expressly teaches a “tank capacity” resource, as well as generic plant resources at page 51, column 3, 2nd paragraph. Moreover, Appellants have acknowledged in the Brief that the secondary Tanaka reference teaches the use of discrete constraints C1, C2, and C3 (*see* App. Br. 7, ¶2). Therefore, we find the evidence supports the Examiner’s position that the combination of Goldman and Tanaka also teaches scheduling activities (and smaller activities) based on the use of discrete constraints, as claimed.

Appellants next proceed to argue the obviousness rejection of Goldman in view Tanaka as four separate groups (App. Br. 7-8). While Appellants have grouped claims 1-11, 13, 27, and 33 together in the Brief (App. Br. 4, 7), we note that dependent claims 4 and 9 were not rejected by the Examiner as being obvious over Goldman in view Tanaka. Therefore, we consider first the Examiner’s rejection of claims 1-3, 5-8, 10, 11, 13, 27, and 33 as being unpatentable over Goldman in view of Tanaka (corresponding to the first group argued by Appellants, *see* App. Br. 7).

Regarding claims 1-3, 5-8, 10, 11, 13, 27, and 33, Appellants contend that the rejection of these claims as being unpatentable over Goldman in view of Tanaka should be overturned because each of these claims contains the recitation that the activities and smaller activities are scheduled “based on discrete and continuous constraints, wherein the continuous constraints

are related to other variables by linear mathematical relationships.” (App. Br. 7).

We disagree with Appellants for the reasons previously discussed, and also because the Examiner’s rejection is based on the *combination* of Goldman and Tanaka. We find Appellants’ arguments are directed to the individual references in isolation rather than the combination of references as a whole. The Examiner relies on the Tanaka reference for its teaching of using linear mathematical relationships as constraints (*see* Tanaka, col. 1, ll. 46-49). Our reviewing court has determined that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. *In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986).

Regarding claims 14-17, 28, 32, and 34, Appellants note that each of these claims recites the use of discrete and continuous constraints and that the continuous constraints are related to other variables by linear mathematical relationships (App. Br. 7). Appellants contend that these elements are not taught or suggested by the Goldman and Tanaka references, alone or combined (*id.*). Appellants further note that these claims recite that activities are scheduled “in accordance with integrated implications of the discrete and continuous constraints.” (App. Br. 7-8).

In response, we note that the Examiner’s rejection is based on the *combination* of Goldman and Tanaka, as discussed above. Thus, we find that the Examiner’s proffered combination of Goldman and Tanaka reasonably teaches and/or suggests that activities are scheduled “in

accordance with integrated implications of the discrete and continuous constraints,” as claimed (claim 14). We direct Appellants’ attention to our discussion of Goldman’s discrete and continuous constraints above.

Regarding claims 19 and 29, Appellants contend that these claims are allowable over Goldman and Tanaka because claims 19 and 29 recite modifying activities into sets of smaller activities, modifying both discrete and continuous constraints, and also that the continuous constraints are related to other variables by linear mathematical relationships (App. Br. 8).

In response, we have fully addressed the issue of modifying activities into sets of smaller activities, as discussed *supra*. Regarding the issue of modifying both discrete and continuous constraints, we find Goldman’s broad teaching of identifying constraints that must be *relaxed* reasonably teaches and/or suggests the claimed modification of both discrete and continuous constraints (Goldman p. 49, col. 2, ¶1). Moreover, we note that Goldman also teaches “propagating temporal constraints.” (*id.*). In this context, Goldman clarifies that “[a]ctivities need not be tied to exact starting (and ending) times.” (p. 49, col. 2, last paragraph). Therefore, we agree that Goldman’s teaching of shifting start and/or ending time relationships between tasks by propagating temporal constraints supports the Examiner’s finding that Goldman teaches and/or suggests modifying constraints, as claimed.

Regarding claim 18, Appellants contend that this claim is allowable over Goldman and Tanaka because it references “chronological backtracking.” (App. Br. 8).

In response, we note that claim 18 recites “wherein the backtracking comprises chronological backtracking *or* dynamic backtracking.” Since the chronological backtracking and dynamic backtracking are recited in the alternative, we find the language of the claim is clearly met by Goldman’s express teaching of “dynamic backtracking” in the last paragraph of column 1 on page 55.

We note that Appellants have not separately addressed the Examiner’s rejection of independent claim 29 as being unpatentable over Goldman in view of Tanaka. Therefore, we sustain the Examiner’s rejection of independent claim 29 for the same reasons set forth by the Examiner in the Answer (pp. 3-4), and also for the reasons discussed above regarding independent claims 1, 14, 19, 27, 28, 32, 33, and 34.

For at least the aforementioned reasons, we conclude Appellants have not established that the Examiner erred with respect to establishing a *prima facie* case of obviousness for claims 1-3, 5-8, 10, 11, 13-19, 27-29, and 32-34. Accordingly, we sustain the Examiner’s rejection of these claims as being unpatentable over the teachings of Goldman in view of Tanaka.

II. Second-stated rejection (Zweben in view of Tanaka)

Claims 1-11, 14-15, 19, 27-29, 33, and 34

We consider next the Examiner’s rejection of claims 1-11, 14-15, 19, 27-29, 33, and 34 as being unpatentable over Zweben in view of Tanaka.

With respect to all claims 1-11, 14-15, 19, 27-29, 33, and 34 that stand rejected as being unpatentable over Zweben in view of Tanaka, Appellants

contend that Zweben does not teach or suggest modifying selected activities into smaller activities (App. Br. 9).

We disagree. In particular, we note that Zweben expressly teaches that “[a] preemptive constraint can cause a task to be *split into subtasks*.” (col. 16, ll. 52-53, emphasis added). While Appellants contend in the Reply Brief (p. 2, ¶3) that Zweben’s teaching of splitting tasks is not equivalent to a division of activities, we find this argument to be without merit because Zweben expressly defines a task as an activity, as follows:

Herein, “task” refers to any *activity* including, but not limited to, production, repair, shipping, maintenance, inspection, packaging, loading, picking, testing and chemical processing. (Zweben, col. 14, ll. 13-16).

Therefore, we conclude that the scope of an “activity” (as claimed) broadly but reasonably encompasses Zweben’s “task” that is split into subtasks.

Appellants next proceed to argue the obviousness rejection of Zweben in view Tanaka as three separate groups that we address *infra* (App. Br. 9-10).

Regarding claims 1-11, 27, and 33, Appellants contend that the rejection of these claims as being unpatentable over Zweben in view of Tanaka should be overturned because each of these claims contains the recitation that the activities and smaller activities are scheduled “based on discrete and continuous constraints, wherein the continuous constraints are related to other variables by linear mathematical relationships.” (claim 1; App. Br. 9).

After reviewing the record before us, we find that Appellants have failed to traverse the Examiner's rejection. Specifically, Appellants have failed to comply with the requirements of 37 C.F.R. § 1.111(b) by merely reciting the language of the claim and asserting that such language is not taught by the reference. We note that a statement which merely points out what a claim recites will not be considered an argument for separate patentability of the claim. *See* 37 C.F.R. § 41.37(c)(1)(vii)(2006). Thus, we find Appellants have not met the burden of coming forward with evidence or argument to rebut the Examiner's legal conclusion of obviousness.

Moreover, we agree with the Examiner that the combination of Zweben and Tanaka teaches scheduling activities (and smaller activities) "based on discrete and continuous constraints, wherein the continuous constraints are related to other variables by linear mathematical relationships," as claimed (claim 1). Specifically, we find Zweben teaches a scheduling system that schedules tasks (i.e., activities) using resource constraints (i.e., discrete constraints) and temporal constraints (i.e., continuous constraints) (*see* Zweben, col. 14, ll. 47-64, i.e., "resource constraints"; *see also* col. 14, ll. 30-41, i.e., "temporal constraints"). As previously noted, Appellants have acknowledged in the Brief that the secondary Tanaka reference teaches the use of discrete constraints (*see* App. Br. 7, ¶2). We again note that the Examiner has relied on the Tanaka reference for its teaching of using linear mathematical relationships as constraints (*see* Tanaka, col. 1, ll. 46-49). The Examiner's rejection is based on the combination of Zweben and Tanaka. *See In re Merck & Co.*, 800 F.2d

at 1097. Because we conclude that Appellants have not shown error in the Examiner's prima facie case of obviousness, we sustain the Examiner's rejection of claims 1-11, 27, and 33 as being unpatentable over Zweben in view of Tanaka.

Regarding claims 14-15, 28, and 34, Appellants contend that the rejection of these claims as being unpatentable over Zweben in view of Tanaka should be overturned because each of these claims recites the use of discrete and continuous constraints and that the continuous constraints are related to other variables by linear mathematical relationships (App. Br. 9). Appellants contend that these elements are not taught or suggested by the Zweben and Tanaka references, alone or combined. (*id.*). Appellants further note that these claims recite that activities are scheduled "in accordance with integrated implications of the discrete and continuous constraints." (App. Br. 9-10).

In response, we disagree with Appellants' contentions, noting again that the Examiner's rejection is based on the *combination* of Zweben and Tanaka. Moreover, we find that the Examiner's proffered combination of Zweben and Tanaka reasonably teaches and/or suggests that activities are scheduled "in accordance with integrated implications of the discrete and continuous constraints," as claimed (claim 14). We direct Appellants' attention to our discussion of Zweben's discrete and continuous constraints above. Because we conclude that Appellants have not shown error in the Examiner's prima facie case of obviousness, we sustain the Examiner's

rejection of claims 14-15, 28, and 34 as being unpatentable over Zweben in view of Tanaka.

Regarding claims 19 and 29, Appellants contend that these claims are allowable over Zweben and Tanaka because claims 19 and 29 recite modifying activities into sets of smaller activities, modifying both discrete and continuous constraints, and that the continuous constraints are related to other variables by linear mathematical relationships (App. Br. 10). Appellants again contend that modifying the activities into sets of smaller activities is not shown in Zweben. Appellants further contend that the Examiner has not pointed out where the references discuss modifying the discrete and continuous constraints. Finally, Appellants contend that the relationship of the continuous constraints to other variables in the manner claimed is not shown in the references (*Id.*).

In response, we disagree with Appellants' contentions for the same reasons set forth by the Examiner in the Answer, and as discussed above. We note again that the Examiner's rejection is based upon the *combination* of Zweben and Tanaka. Thus, we agree with the Examiner that the combination of Zweben and Tanaka reasonably teaches and/or suggests "wherein the continuous constraints are related to other variables by linear mathematical relationships," as claimed (claim 19). Regarding Appellants contention that the references do not discuss modifying the discrete and continuous constraints, we note that Zweben expressly teaches "[t]he system of the invention can also be easily modified to add, delete, or *modify* constraints." (Zweben, Abstract, emphasis added). We agree with the

Examiner that the scope of this teaching by Zweben (Abstract) applies to both discrete and continuous constraints, as discussed above (*see* Zweben, col. 14, ll. 47-64, i.e., “resource constraints”; *see also* col. 14, ll. 30-41, i.e., “temporal constraints”). Because we conclude that Appellants have not shown error in the Examiner’s *prima facie* case of obviousness, we sustain the Examiner’s rejection of claims 19 and 29 as being unpatentable over Zweben in view of Tanaka.

For at least the aforementioned reasons, we find Appellants’ arguments unpersuasive. Accordingly, we sustain the Examiner’s rejection of claims 1-11, 14-15, 19, 27-29, 33, and 34 as being unpatentable over the teachings of Zweben in view of Tanaka.

OTHER ISSUE

In the event that prosecution is reopened in this application, we leave it to the Examiner to consider whether the subject matter of claims 1-19 and 34 constitutes eligible subject matter under 35 U.S.C. § 101 in view of *In re Comiskey*, 499 F.3d 1365 (Fed. Cir. 2007). Here, we note that claims 1-19 and 34 recite a method or system for scheduling tasks or activities without integrating a machine (e.g., a computer), or constituting a process of manufacture, or altering a composition of matter. Therefore, the nature of the subject matter claimed may be broadly but reasonably considered to be a mental process since the claims do not recite a tangible embodiment. Because these claims on appeal are not tied to a machine or other statutory subject class, the Examiner should consider a rejection of claims 1-19 and 34 under 35 U.S.C. § 101.

CONCLUSION OF LAW

Based on the findings of facts and analysis above, we conclude that Appellants have not shown the Examiner erred in rejecting claims 1-11, 13-19, 27-29, and 32-34 under 35 U.S.C. § 103(a) for obviousness.

DECISION

The decision of the Examiner rejecting claims 1-11, 13-19, 27-29, and 32-34 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

Appeal 2007-3133
Application 09/188,399

HONEYWELL INTERNATIONAL INC.
101 COLUMBIA ROAD
P O BOX 2245
MORRISTOWN NJ 07962-2245